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How insects carry and cause disease; Cockroaches, beetles, thrips; Lice; Bedbugs; Mosquitoes as disease bearers, and their control; Buffalo gnats and horseflies; Common house fly; House fly control; Bloodsucking Muscids; Myiasis; Fleas; Ticks; Mites. An interesting final chapter is given to the discussion of venomous insects and arachnids,—as bees, wasps, spiders, scorpions, etc. The nature of the venom, the manner of its introduction, and its effects are treated.

The book is well illustrated with half-tones, has numerous keys for the identification of the principal genera, and gives the best accepted treatments for control of the insects and of the resultant diseases.

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Medical and Veterinary Entomology, by William B. Herms. 394 pages, illustrated. The Macmillan Co., New York, 1915. Price, \$4.00.

#### CLASSIFICATION OF LEPIDOPTEROUS LARVÆ

Number one of Volume two of the Illinois Biological Monographs bears the above title, and is the thesis of the author, S. B. Fracker, offered in the Graduate School of the University of Illinois toward the degree of Doctor of Philosophy in Entomology.

The paper is divided into two parts; the first being devoted to the question of the homology of the setæ of the larvæ of Lepidoptera, and the second to the systematic outline of the families and genera.

The position taken by the author, that a final classification of the insects based upon both the larval and adult characters necessarily eliminates errors that belong to a classification based solely on either, must commend itself to the general student. It is surely true also that anything which will make identification of insects more possible in the larval stages will save much trouble and time required to rear them to maturity for more certain identification.

The proffered classification is based largely upon the setæ and the armature developed in connection with them, the head parts, the size and shape of the spiracles, the prolegs and the hooks they bear, and other structures somewhat less certain.

The portion of the paper that will prove most suggestive to the general biologist is the discussion of the setæ, the method of homologizing them, and the evidence for their sufficient identity for comparative purposes.

The first step is to get a standard or type segment so far as setal arrangement is concerned. This is done by taking the various thoracic and abdominal segments in the more generalized members of the two sub-orders, and plotting from these the setal arrangement by superimposing them so as to get a composite. This composite gave about 15 setæ with approximately the distribution found on the pro-thorax of the most generalized and primitive types. With this composite all the different segments of every larva were compared. In a similar way a type of abdominal segment is worked out and used as a standard.

The author concludes that the first-stage larva, before entering upon the various moults, best represents the ancestral type of Lepidoptera and that the setal arrangement of the first instar is essentially the same as in the ancestors, and thus serves as a connecting link between the more generalized type and the modern, specialized older stages.

The various tests of homology of setæ used by the author are:—

(1) similar grouping of setæ in mature caterpillars generally; (2) similar position of setæ on certain segments of modern mature caterpillars; (3) similar arrangement of setæ on all the segments of generalized groups of caterpillars; (4) similar arrangements on all the segments of newly hatched larvæ; and (5) evidences of migration from these similar positions.

The author believes that the setal arrangement of every segment of the body of the larvæ of Lepidoptera has been derived from the same ancestral type; that 12 such primary setæ can be homologized; that these primary setæ are present in the first instar; that they may be modified by loss chiefly (abdominal segments) or by loss and change of position. Sub-primary setæ appear in later instars and may become associated with the primary setæ in ways more or less confusing. They may develop in tufts of various kinds.

The systematic part is based upon maturer larvæ, but the characters apply for the most part to the earlier also. Elaborate keys of the order and of the families, leading to the genera, are supplied.